

# **Developing and Using Implementation Evidence in Research and Development Efforts**

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# Common Guidelines (IES & NSF, 2013)

Type of Research	Focus of Implementation Research
Design and development	<p>Develop measures with evidence of technical quality for assessing the implementation of the intervention in an authentic education delivery setting</p> <p>Develop evidence demonstrating the project's success in implementation (feasibility of implementation)</p>
Efficacy, impact, and scale-up	<p>Study reports should document implementation of both the intervention and the counterfactual condition in sufficient detail for readers to judge applicability of the study findings.</p> <p>Identify the organizational supports, tools, and procedures that were key features of the intervention implementation. If no evidence of a favorable impact is found, the project should examine possible reasons (e.g., weaknesses in implementation, evidence that raises questions about particular aspects of the logic model).</p>

# Why Implementation Research?

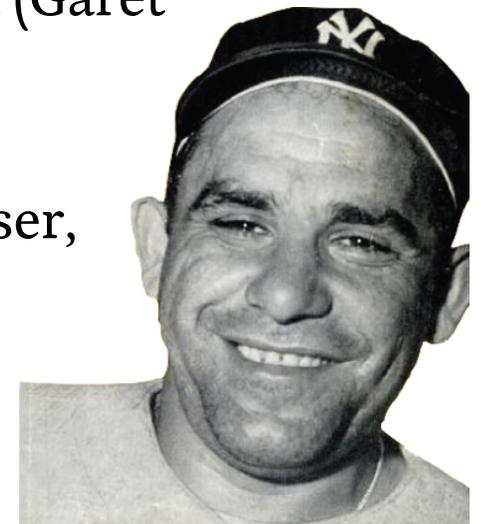
- All innovations with significant potential to transform teaching and learning present *learning problems* to educators.
- Implementation takes place within complex educational systems characterized by
  - Multiple, competing goals and initiatives
  - Actors with different aims and authority
  - Contests over limited resources, including (maybe especially) professional development

# Making Use of Implementation Research in Design

- Design supports to help teachers address some of the predictable challenges to implementing innovations (Weinbaum & Supovitz, 2010)
- Adapt professional development on the basis of variation in implementation (Harris, Phillips, & Penuel, 2012)

# Déjà Vu All Over Again

- Teachers, coaches, and principals' *interpretations* of the standards shape classroom practice (Coburn, 2006; Spillane, 2004; Spillane, Reiser, & Gomez, 2006).
- Even when policymakers align elements of the system to cohere, it's teachers' perceptions of coherence that shape implementation (Penuel et al., 2009).
- Standards implementation benefits from content-focused professional development of an extended duration (Garet et al., 2001; Supovitz & Turner, 2000).
- Curriculum materials provide useful models for standards implementation (Krajcik, McNeill, & Reiser, 2008; Penuel et al., 2011)



# Design-Based Implementation Research

**An approach to research and development**

**focused on addressing persistent problems of practice**

**from multiple stakeholders points of view**

**that engages educators, subject matter specialists, and educational researchers in collaborative, iterative design**

**and that develops knowledge and theory while also building capacity for continuous improvement**

# Descriptions and Examples

Penuel, W. R., Fishman, B. J., Cheng, B, & Sabelli, N. (2011). Organizing research and development at the intersection of learning, implementation, and design. *Educational Researcher*, 40(7), 331-337.

Penuel, W. R., & Fishman, B. J. (2012). Large-scale intervention research we can use. *Journal of Research in Science Teaching*, 49(3), 281-304.

# Matching Phase of Development to Phase of Research in DBIR

Phase of Development	Driving Questions	Sources of Evidence
Problem Negotiation	What problem of practice should be the focus of our joint work?	Available data from multiple sectors Research evidence Perspectives and values of stakeholders (including nonschool actors)
Co-design	What should be the focus of our work? To what extent do teams leverage the diverse expertise of stakeholders?	Design Rationales Ethnographic accounts of design processes

# Matching Phase of Development to Phase of Research in DBIR

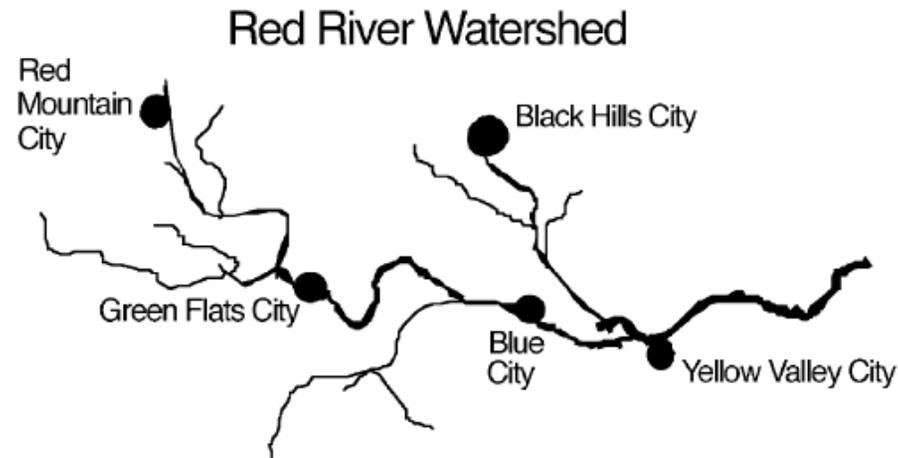
Phase of Development	Driving Questions	Sources of Evidence
Early implementation	How do implementers adapt the innovation to their local contexts? How do implementers use the innovation to reconstruct their practice? What are the appropriate measures of impact?	Observations of implementation Interviews Assessment design
Efficacy	What is the potential impact of the innovation on teaching and learning? What mediates impacts on learning?	Randomized Controlled Trials Interrupted Time Series Designs Explanatory Case Studies

# Matching Phase of Development to Phase of Research in DBIR

Phase of Development	Driving Questions	Sources of Evidence
"Translation"	What supports are needed to implement the program effectively? What are the conditions for sustainability?	Experimental comparisons of different means of support Explanatory comparative case analysis

# An Example: LeTUS

Below is a map of the Red River watershed and the cities on the river.  
Use the information in the map to answer the questions below.



- 1. The direction that the water in the Red River is flowing is from**
  - a. Yellow Valley City to Black Hills City
  - b. Red Mountain City to Yellow Valley City
  - c. Green Flats City to Red Mountain City
  - d. Blue City to Red Mountain City
  
- 2. The direction that water in a river flows is affected by a change**
  - a. from lower elevation to higher elevation
  - b. from higher elevation to lower elevation
  - c. in the wind direction from east to west
  - d. in temperature from cold to hot

# Iterative Refinements

Step	Sources of Evidence
Analysis of student difficulties in map reading	Qualitative analysis of student responses to pair of assessment items
Modifications to curriculum materials	Conclusions about student learning needs
Modifications to professional development design	Conclusions about needed teacher strategies to promote improved student understanding
Implementation of the professional development	Observations, survey
Students take pretests	Assessment items (same as in first year)
Teacher implementation of revised materials	Observations, logs
Students take posttests	Assessment items (same as in pretest)
Analysis of student difficulties in map reading	Qualitative analysis of student responses to pair of assessment items

# What makes this an example of DBIR?

- Team was guided by the aim of maximizing the fit of the curriculum to the context.
  - The team adjusted professional development and curriculum to support implementation.
- Team focused on tracing the links empirically from professional development to classroom practice to student learning.
  - The team employed *measures* of professional development, teaching, and learning.

# To Learn More...

## Design-Based Implementation Research

Barry J. Fishman  
William R. Penuel  
Anna-Ruth Allen  
Britte Haugan Cheng  
*Editors*

**National Society for the Study  
of Education Yearbook**

Forthcoming:  
November 2013

### Two Relevant Chapters:

Russell, J. L., Jackson, K., Krumm, A. E., & Frank, K. A. (in press). Theories and research methodologies for design-based implementation research: Examples from four cases.

Means, B., & Harris, C. (in press). Towards an evidence framework for design-based implementation research.

[http://tinyurl.com/  
n3db58y](http://tinyurl.com/n3db58y)

# Research + Practice Collaboratory



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